

STANDARD OPERATING PROCEDURE 4

Shallow Surface Water Sample Collection

Scope and Application

Surface water samples will be collected from seven locations within the Little Squalicum Park boundaries and a background location to be determined. There are two sampling rounds planned for this investigation, both during the wet season. The wet season samples will be collected between October and May.

Equipment and Reagents Required

- Sampling and Analysis Plan (SAP)
- Health and Safety Plan (HASP)
- Site logbook and sample log
- Indelible black-ink pens and markers
- Camera
- Any of the following equipment may be used to collect samples:
 - A Teflon/stainless steel scoop with a Teflon/stainless steel handle
 - A stainless steel beaker clamped to a pole
 - Sample bottles (direct fill)
 - Portable peristaltic pump with Teflon tubing
- Water quality meter(s)
- pH paper
- Sample containers
- Insulated cooler(s), chain-of-custody seals, Ziploc® bags
- Sample labels and appropriate documentation
- Decontamination equipment (SOP-10)

Procedures

Surface water samples shall be collected moving in an upstream direction utilizing the following procedure:

1. Immediately before collecting the sample, record the temperature, dissolved oxygen, pH, turbidity, and specific conductance using a Horiba® water quality meter or equivalent and following the manufacturer's specifications.
2. Submerge the bottle, beaker or scoop and collect a sample. When pouring the water from a beaker or scoop into another bottle container, care should be exercised so as not to aerate the sample. VOC samples will be collected first.
3. A peristaltic pump can also be used if available.
4. Preserve containers as follows:
 - a. VOCs - Determine the volume of 1:1 HCl preservative required to adjust the pH of the sample to less than 2 on an extra 40 ml glass vial prior to sampling. Pre-preserve sample bottles with the determined volume of HCl (if possible) and fill with sample. Check the bottle for the presence of trapped air by tapping the bottle when filled and capped.
 - b. Other Parameters - Add appropriate volume of preservative (as specified in the SAP) to sample bottle. Verify pH by pouring a minimal portion of the sample onto broad range pH paper.
5. Complete sample logs, labels, custody seals, and chain of custody forms. Record sample information in the field notebook.
6. Place the analytical samples in a cooler for shipment and chill to 4°C (SOP-9).
7. Decontaminate sampling equipment in accordance with SOP-10.

STANDARD OPERATING PROCEDURE SOP-5

Sediment Sampling – Shallow Water

Scope and Application

Surface sediment sampling will be conducted at 6 locations within Little Squalicum Creek to define the extent of hot spots detected during previous investigations (i.e., Ecology 2004 study). A background sediment sample will also be collected at a location(s) to be determined. Surface sediments will be collected using a stainless steel shovel or trowel. Sediment samples will be obtained following the collection of surface water samples at each location, if possible, and will be collected moving in an upstream direction.

Equipment and Reagents Required

- Sampling and Analysis Plan (SAP)
- Health and Safety Plan (HASP)
- Site logbook and sample log
- Indelible black-ink pens and markers
- Camera
- Stainless steel shovel, trowel, or spoon
- Photoionization detector (PID)
- Ponar grab (or equivalent), in deeper water
- Sample containers
- Sample labels and appropriate documentation
- Assorted geology supplies (e.g., hand lens, grain size card, scales, etc.)
- Insulated cooler(s), chain-of-custody seals, Ziploc® bags
- Decontamination equipment (SOP-10)

Procedures

1. After collection of surface water samples at a location, use a decontaminated stainless steel shovel or trowel to scrape away surficial organic material (grass, leaves, etc.).

2. Obtain sediment for analysis using a stainless steel shovel, trowel or spoon from the surface to 4 inches below sediment surface. Fill sample container for volatile (e.g., H₂S) parameters as discrete grab samples. Then, empty remaining contents of shovel/trowel into a decontaminated stainless steel bowl or pan. Repeat until enough sediment is collected to fill all other required containers.
3. Homogenize sediment within bowl/pan with decontaminated stainless steel trowel or spoon. Remove rocks, twigs, leaves and other large debris as appropriate. Fill sample containers for remaining chemical parameters. (Volatiles samples should not be composited but collected from a discrete location within the depth interval.)
4. Describe soil in accordance with ASTM D2488 on the sample log form.
5. Complete sample logs, labels, custody seals, and chain of custody forms. Record sample information in the field notebook.
6. Place the analytical samples in coolers for shipment and chill to 4°C (SOP-9).
7. Decontaminate sampling equipment in accordance with SOP-10.

STANDARD OPERATING PROCEDURE 6

Hollow-Stem Auger Drilling/Sediment Sampling

Scope and Application

Sediment borings will be advanced at 24 locations to define the width and depth of contamination in Little Squalicum Creek. After surface samples have been collected, sediment borings will be collected along three transects (3-5 borings each) across the creek bed, using a track-mounted, portable, hollow stem auger to collect samples at depth. The drill rig proposed for this work has a small foot-print allowing maneuverability within the creek bed without excessive disturbance of creek sediment, bank soils, and vegetation.

Required Equipment

- Sampling and Analysis Plan (SAP)
- Health and Safety Plan (HASP)
- Site logbook and boring log
- Indelible black-ink pens and markers
- Camera
- Hollow-stem auger drill rig
- Driller and helper
- Split-spoon samplers
- Photoionization detector (PID)
- Plastic sheeting
- 55-gallon drums (if required)
- Insulated cooler(s), chain-of-custody seals, Ziploc® bags
- Sample labels and appropriate documentation
- Assorted geology supplies (e.g., hand lens, grain size card, scales, etc.)
- Decontamination equipment (SOP-10)

Typical Procedures

Preparation:

1. Conduct site activity/health and safety briefing.
2. Calibrate field instrumentation.
3. Record necessary data in field logbook.
4. Obtain photograph(s) of site before drilling.
5. Place plastic sheeting and/or drums at drilling location to collect cuttings (if necessary).
6. Move equipment and supplies to drilling location.
7. Set up decontamination and sampling stations.

Construction:

1. Obtain surface soil samples, if required.
2. Drill to first sampling depth, as described in the SAP.
3. Place decontaminated split-spoon sampler on center rods.
4. Drive split-spoon sampler as described in American Society for Testing and Materials (ASTM) Method D-1586. Drive sampler to 18 inches or to refusal (no progress for 50 blows). Record blow counts on boring log form. Retrieve sampler.
5. A larger 3-inch diameter, 2-ft length split-spoon may be used to obtain more sediment from each depth interval.
6. Screen sampler with PID (if required).
7. Describe soil in accordance with ASTM D2488 on the boring log form.
8. Composite soil sample as necessary. If volatile organic compound (VOC) samples are to be collected, collect sample prior to describing soil.
9. Continue drilling to next sample location. Collect samples as outlined above.
10. Label and manage sample containers in accordance with SOP-9 for shipping and handling of samples.
11. Decontaminate sampling equipment in accordance with SOP-10.
12. Document activities in site logbook.

13. Since the total depth of each boring will be only 5 ft below sediment surface, boreholes can be filled with cuttings after hole is complete. No grouting of borehole is required.
14. Move to next location.